

REMARKS

Claims 20 to 23, 26, and 27 were pending in the present application when last examined. Applicant has amended claims 20 and 26. Claims 20 to 23, 26, and 27 remain pending in the present application.

Allowable Subject Matter

Applicant thanks the Examiner for allowing claims 21 to 23.

§102 Rejections**Claims 20**

The Examiner rejected claim 20 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,232,150 ("Lin et al."). Addressing Applicant's arguments that Lin et al. does not teach a reactive foil that produces an exothermic reaction, the Examiner stated:

The examiner respectfully disagrees with the remark because the fusion bonding and eutectic bonding processes used in Lin, that involves the bonding material and the microheater clearly produces an exothermic reaction wherein one embodiment, Lin teaches the bonding material is the decomposition product of a gaseous precursor which decomposes on contact with, or in the presence of, heat generated by the resistance micro-heater (col. 8, lines 20-24).

May 19, 2006 Final Office Action, p. 3. Applicant respectfully traverses.

A fusion bond is formed by heating and pressing two surfaces together to melt and join the two surfaces at their interface. A eutectic bond is formed by heating two or more materials (e.g. Au and Si) in an interface such that they diffuse together to form an alloy composition that melts at a lower temperature than the base materials. As the Examiner can see, both the fusion bond and the eutectic bond require heat. Thus, they are formed in endothermic reactions that absorb heat; they are not formed in exothermic reactions that release heat.

The Examiner may have confused the roles played by the microheater and the bonding material. Lin et al. discloses the microheater provides the heat needed by the bonding material to form the fusion bond and the eutectic bond. Thus, the microheater has the same role as the recited reactive foil in claim 20. However, the microheater is a resistance heater that releases heat when an electrical current is passed through it against electrical resistance of its material. On the other

hand, the reactive foil is initiated (e.g., ignited) to start an exothermic reaction that releases heat. Thus, the microheater is different than the recited reactive foil of claim 20.

To further emphasize this distinction, Applicant has amended claim 20 to recite "the intermetallic mixture being formed after an exothermic reaction of the reactive foil that releases heat to the bonding material." For the reasons above, amended claim 20 is patentable over Lin et al.

Claims 26 and 27

The Examiner rejected claims 26 and 27 under 35 U.S.C. §102(b) as being anticipated by Lin et al. Applicant has amended claim 26 to recite similar limitations as amended claim 20. Thus, amended claim 26 is patentable over Lin et al. for at least the same reasons as amended claim 20. Furthermore, amended claim 26 is patentable over Lin et al. for the following reasons that were presented in the last response but the Examiner did not address in the outstanding office action.

The figures and the columns of Lin et al. cited by the Examiner against claim 26 do not disclose an intermetallic mixture that bonds a device to a metal line, where the intermetallic mixture has materials from a reactive foil and a bonding material. Specifically, Fig. 13 does not even illustrate a device bonded on a substrate. Instead, Fig. 13 simply illustrates "an example of a small scale experimental testing setup executing and implementing the method process and related structure" Lin et al., col. 8, line 66 to col. 9, line 2.

Fig. 14a also does not illustrate a device bonded on a substrate. Fig. 14a simply illustrates a "localized, indirect bonding process[] which incorporates intermediate layers ... specifically PSG-to-glass fusion bonding." Lin et al., col. 14, lines 34 to 36.

Fig. 14b illustrates a dew point sensor on a Si substrate. However, Lin et al. is silent as to if and how the dew point sensor is bonded on the Si substrate. Otherwise, Fig. 14b simply illustrates a "localized, indirect bonding process[] which incorporates intermediate layers ... specifically ... Indium-to-glass bonding." Lin et al., col. 14, lines 34 to 37.

Col. 4, lines 10 to 35 of Lin et al. is the Summary of the Invention. The Summary normally does not provide an enabling disclosure such as those provided by the Detailed Description. Even assuming that Summary does provide an enabling disclosure, it nonetheless does not disclose an intermetallic mixture that bonds a device to a metal line, where the intermetallic mixture has materials from a reactive foil and a bonding material. Instead, the

Summary generally describes a microheater for bonding two substrates. Accordingly, claim 26 is patentable over Lin et al.

Claim 27 depends from claim 26 and is patentable for at least the same reasons as claim 26.

Summary

In summary, claims 20 to 23, 26, and 27 were pending in the above-identified application. Applicant has amended claims 20 and 26. For the above reasons, Applicant respectfully requests allowance of claims 20 to 23, 26, and 27. Should the Examiner have any questions, please call the undersigned at (408) 382-0480x206.

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Respectfully submitted,



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